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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/556,067

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Mitsuaki Komino

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EXAMINER

CHEN, KEATH T

ART UNIT

PAPER NUMBER

1792

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/556,067	Applicant(s) KOMINO ET AL.	
	Examiner Keath T. Chen	Art Unit 1792	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 19 May 2008.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-13 is/are pending in the application.
- 4a) Of the above claim(s) 3-5, 9 and 12 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-2, 6-8, 10-11, and 13 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Response to Amendment

The specification and abstract amendment filed on 05/19/2008 is acknowledged. The claim amendment filed on 05/19/2008, addressing rejection of claims 1-2, 6-8, 10-11, and 13 from the first office action (02/19/2008), by amending claims 1-2 and 4-13 is acknowledged and will be addressed below.

Election/Restrictions

1. Claims 3-5, 9, and 12 withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected species, there being no allowable generic or linking claim.

Claim Rejections - 35 USC § 112

The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

2. Claims 1-2, 6-8, 10-11, and 14 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claims contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventors, at the time the application was filed, had possession of the claimed invention.

Claims 1 and 6 recite "a portion of the metal plates extending to an outside of the semiconductor manufacturing device" and "a thin plate-shaped resistive heating element sandwiched and covered by a pair of metal plates"; the metal plates are

depicted in Fig. 5 as 51a and 51b that do not extends to an outside of the semiconductor manufacturing device, the flange 52 is.

Claim 6 recites "the metal plates being arranged so as to detachably cover the inner wall face ..."; there is not disclosure of metal plates being detachable, instead, the whole heating unit is disclosed as being detachable.

Claim Rejections - 35 USC § 103

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

3. Claims 1-2, 6-7, and 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Umotoy et al. (US 20010054381, hereafter '381), in view of Nakamura et al. (US 4346285, hereafter '285) and Myers et al. (US 4980557, hereafter '557).

'381 teaches some limitations of:

Claim 1: A semiconductor manufacturing device (Fig. 2a, cross section view of Fig. 1) comprising: a processing chamber (#250, [0033]); a supply passage (showerhead #300, Fig. 1, [0032]) for supplying a processing gas to an inside of the processing chamber; a transferring passage (#260, slit valve, [0050], lines 7-11) through which a wafer is to be put into and taken out of the processing chamber; an exhaust passage (#600, exhaust assembly, [0030]) through which the processing gas inside the processing chamber is to be exhausted; and a sheet-like heating unit (heated liner #200 with embedded heater #215, [0034], lines 5-7) arranged to heat an inner wall face (inside of #250, [0033], lines 9-11) of the processing chamber, the heating unit including

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a resistive heating element (#215, [0034]), the heating unit (#200) being arranged so as to detachably (liner #200 is intrinsically detachable) cover the inner wall face from an inner side ([0034], lines 5-7) of the processing chamber.

Claim 6: A heating unit (heated liner #200 with embedded heater #215, [0034], lines 5-7) for heating, in a semiconductor manufacturing device, an inner wall face (inside of #250, [0033], lines 9-11) of a processing chamber, comprising: a thin plate-shaped resistive heating element (#200); and define the processing chamber (#280 chamber cavity is defined by #200, [0049]).

'381 also teaches an embedded resistive heater #215, but is silent on the shape of the heater (probably mirror the shape of #200) and how it is embedded. '381 further recognized the difficulty to achieve uniform heating of the chamber walls ([0006]).

'381 does not explicitly teach the limitations of:

Claim 1: (the heating unit including) a thin plate-shaped (resistive heating element) sandwiched and covered by a pair of metal plates, a portion of the metal plates extending to an outside of the semiconductor manufacturing device, wherein a space between the metal plates in a region of the metal plates which is to be exposed to the processing gas is sealed with a spacer at edges of the metal plates in the region to be exposed to the processing gas, and wherein edges of the portion of the metal plates which extends to the outside are open to the outside.

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Claim 6: a pair of metal plates that are formed to sandwich and cover the resistive heating element, the metal plates being arranged so as to detachably cover the inner wall face from an inner side of the processing chamber, a portion of the metal plates being arranged to extend to an outside of the semiconductor manufacturing device, wherein a space between the metal plates in a region of the metal plates which is to be exposed to the processing gas is sealed with a spacer at edges of the metal plates in the region to be exposed to the processing gas, and wherein edges of the portion of the metal plates which is to extend to the outside are open to the outside.

'285 is an analogous art in the field of heating device (field of the invention, which '381 lacks of details), particularly in achieving uniform heating (col. 2, lines 32-38, '381, [0006]). '285 teaches a thin plate resistive material (Fig. 5, #104a, col. 5, lines 17-22) sandwiched and covered by a pair of conductive plates (electrodes #104b and #104c, col. 5, lines 22-24, aluminum #101 and #102 is mentioned as a material connected to electrodes, Fig. 4, col. 5, lines 12-15, which is a suitable electrode material too). Note the metal plates are intrinsically detachable.

'557 is an analogous art in the field of optimizing function of heater (col. 3, lines 25-29), particularly in uniform heating (col. 6, lines 1-2; '381, [0006]). '557 teaches using ceramic sealant/spacer (#23, Fig. 1a, col. 6, lines 3-4) to protect one end of the heater that is exposed to the testing/processing environment (see Fig. 7) while the other end is

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exposing to the outside (Fig. 1a) without ceramic sealant. Note that ceramic sealant is an alternative to one piece arrangement (Fig. 1b) of embedded heater.

At the time the invention was made, it would have been obvious to a person having ordinary skill in the art to have combined '285 and '557 with '381. Specifically, to have adopted a heater made of thin plate-shaped resistive heating element sandwiched by a pair of metal electrode, as taught by '285, to replace the embedded heater #215 in the apparatus in Fig. 2a of '381; for the purpose of improving the heating uniformity, as taught by '285 (col. 2, lines 32-38) and required by '381 ([0006]); and to have used ceramic sealant/spacer to seal the heater end that has a space in the processing region while leaving the other end not exposed to processing region open, as taught by '557, for suitability use.

The selection of something based on its known suitability for its intended use has been held to support a *prima facie* case of obviousness. *Sinclair & Carroll Co. v. Interchemical Corp.*, U.S. 327, 65 USPQ 297 (1945).

As for the "a portion of the metal plates extending to an outside of the semiconductor manufacturing device", it is mere integration of liner #200 with the clamping plate (#216) of '381.

'381, '285, and '557 disclose the claimed invention except for "metal plates extending to an outside of the ... device". It would have been obvious to a person having ordinary skill in the art at the time the invention was made to integrate liner with clamping plate, since it has been held that forming in one piece an article which has

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formerly been formed in two pieces and put together involves only routine skill in the art.

Howard v. Detroit Stove Works, 150 U.S. 164 (1893).

'381 further teach the limitations of:

Claim 2: The semiconductor manufacturing device as set forth in claim 1, wherein the heating unit includes a heating main body (#200 is the main body) to be disposed adjacent to the inner wall face (inside of #250, [0033], lines 9-11), wherein the portion of the metal plates which extends to the outside comprises an attaching portion formed into a flange shape (with the obvious integration of clamping plate/flange #216 and the liner #200 discussed above) or so as to extend integrally with the heating main body (flange is also an integral part of the main body), and wherein the heating unit includes a connector (AC connectors inside feed through portion #214, [0034] lines 11-13) that is provided at the attaching portion (which is annular, also close to #214) to draw out a wire (bottom right of Fig. 2a) for conducting electricity to the resistive heating element and a wire of a temperature sensor (#212, thermocouple, [0034] 2nd last sentence) for detecting a temperature of the resistive heating element.

Claim 7: The heating unit as set forth in claim 6, wherein the heating unit includes a heating main body (#200) to be disposed adjacent to the inner wall face (inside of #250, [0033], lines 9-11), wherein the portion of the metal plates which is to extend to the outside comprises an attaching portion formed into a flange shape (with the obvious integration of clamping plate/flange #216 and the liner #200 discussed above) or to extend integrally with the heating main body (also an integral part of the main body),

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and wherein the heating unit includes a connector (#214, feed through portion, [0034], last sentence) that is provided at the attaching portion so as to draw out a wire for conducting electricity to the resistive heating element and a wire of a temperature sensor (#212, thermocouple, [0034] 2nd last sentence) for detecting a temperature of the resistive heating element.

Claim 13: The heating unit as set forth in claim 7, wherein the heating unit is to be disposed so as to define a space ([0033], line 9-11) for insulating heat between the heating unit and the inner wall face.

4. Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over '381, '285, and '557, in view of Steger et al. (US 5788799, hereafter '799).

'381, '285, and '557, together, teach all limitations of claim 7, as discussed above.

'381 further teaches some limitations of claim 8:

The heating unit of a semiconductor manufacturing device as set forth in claim 7, wherein the heating unit includes a chamber heating unit that is disposed adjacent to the inner wall face of the processing chamber, and the chamber heating unit includes a cylindrical heating main body (#200 is cylindrical, [0033], line 9) to be disposed adjacent to a side wall face (inside of #250, [0033], lines 9-11) of the processing chamber and an attaching portion provided in a flange shape (Fig. 2b) at an end of the heating main body.

'381, '285, and '557, together, do not teach the other limitations of claim 8:

A disk-shaped heating main body to be disposed to face a bottom wall face of the processing chamber and an attaching portion provided to extend on a lower face of the heating main body.

'799 is an analogous art in the field of CVD (field of the invention, '381, field of the invention), particularly in temperature controlled liner (col. 4, lines 11-13, '381, [0009]). '799 teaches the a lower temperature control liner (Fig. 2, #106, col. 7, lines 50-55, part of liner #102) at the bottom of the chamber, in addition to the upper liner (#104) at the side wall of the chamber .

At the time the invention was made, it would have been obvious to a person having ordinary skill in the art to have combined '799 with '381, '285, and '557. Specifically, to have adopted a heater at the bottom of the chamber, as taught by '799, to the apparatus of Fig. 2a of '381, while keeping an attaching portion like Fig. 2b of '381. This heater would have a disk-shape (despite a central hole, which has the same shape as the disk disclosed in Fig. 7 of instant application) and face a bottom wall face of the processing chamber.

The motivation would have been to slow deposit rate on the lower (or bottom) surface ('799, col. 8, line 18-24).

5. Claim 10 is rejected under 35 U.S.C. 103(a) as being unpatentable over '381, '285, and '557, in view of Iwabuchi (US 5755255, hereafter '255).

'381, '285, and '557, together, teach all limitations of claim 7, as discussed above.

'381, '285, and '557, together, do not teach the limitations of claim 10:

The heating unit of a semiconductor manufacturing device as set forth in claim 7, wherein the heating unit includes a transferring passage heating unit that is disposed adjacent to an inner wall face of the transferring passage, and the transferring passage heating unit includes a cylindrical heating main body having a roughly rectangular section and an attaching portion provided in a flange shape on the heating main body.

'255 is an analogous art in the field of semiconductor manufacturing (title), particularly in avoiding contamination of gate valve during operation (col. 2, lines 24-27). '255 provides heating element (Fig. 7A, #243, col. 8, lines 24-28) in an inner wall face of the transferring passage (of gate valve) having cylindrical heating main body (as shown in Fig. 7D) and roughly rectangular section.

At the time the invention was made, it would have been obvious to a person having ordinary skill in the art to have combined '255 with '381, '285, and '557. Specifically, to have adopted the heating element of the gate valve, as taught by '255, to the apparatus of Fig. 2a of '381.

The motivation would have been to avoid contamination of gate valve during operation ('255, col. 2, lines 24-27).

6. Claim 11 is rejected under 35 U.S.C. 103(a) as being unpatentable over '381, '285, and '557, in view of Ohmi et al. (US 20030007917, hereafter '917).

'381, '285, and '557, together, teach all limitations of claim 7, as discussed above.

'381, '285, and '557, together, do not teach the limitations of claim 11:

The heating unit of a semiconductor manufacturing device as set forth in claim 7, wherein the heating unit includes an exhaust passage heating unit to be disposed adjacent to an inner wall face of the exhaust passage, and the exhaust passage heating unit includes a cylindrical heating main body and an attaching portion provided in a flange shape on the heating main body.

'917 is an analogous art in the field of CVD (field of the invention, '381, field of the invention), particularly in avoiding deposition to the processing equipment (exhaust piping, [0023]). '917 provides heating equipment to the exhaust gas passage of the process chamber ([0060]).

At the time the invention was made, it would have been obvious to a person having ordinary skill in the art to have combined '917 with '381, '285, and '557. Specifically, to have adopted the heating of the exhaust passage, as taught by '917, to the apparatus of Fig. 2a of '381, while utilizing the nickel-plated aluminum liner with a

flange (Fig. 2c) from '381 as the heating means at inner wall face of the exhaust passage. The heater would have conformed the shape of the exhaust as being cylindrical.

The motivation would have been to reduce deposition in the exhaust piping ('917, [0023]).

Response to Arguments

Applicant's arguments filed on 05/18/2008 have been fully considered but they are not persuasive:

7. Applicant's arguments with respect to independent claims 1 and 6, as well as dependent claims 2 and 7-18, 10-11 and 3 have been considered but are unconvincing in view of the new grounds of rejection.

Conclusion

8. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any

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extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Keath T. Chen whose telephone number is 571-270-1870. The examiner can normally be reached on M-F, 8:30-5:00 EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael Cleveland can be reached on 571-272-1418. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/K. T. C./

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Examiner, Art Unit 1792

/Michael Cleveland/
Supervisory Patent Examiner, Art Unit 1792